Abstract Submitted
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A study on the magnetic and dielectric behavior of nanostructured $YCrO_3/Al_2O_3$ composite ceramics[1] A. DURAN, H. TIZNADO, J.M. ROMO-HERRERA, Centro de Nanociencias y Nanotecnologia-UNAM, E. VERDIN, UNISON, J. SIQUEIROS, Centro de Nanociencias y Nanotecnologia-UNAM, R. ESCUDERO, IIM-UNAM — Ferroelectric core-shell particles are promising architectures as functional bulk composites for potential use as dielectric resonators, supercapacitors, or multiferroic based devices. The core-shell architecture in ferroelectrics acts as barrier layer localizing electronic and ionic space charges, increasing thus the capacitance density. In bulk multiferroics, the barrier layer improves the grain boundary interface and leads to increased functionality, that is, higher charge storage and lower dielectric losses. In $YCrO_3$, large dielectric losses and changes in the activation energy have shown to be very dependent on the synthesis route as well as in the size, and chemical state of the starting grains. Increase of the conductivity and dielectric losses are associated to loose charge leaking out through the grain boundaries. Here we added an alumina shell-layer of 5, 30 or 90 nm to cover the $YCrO_3$ grains, using an atomic layer deposition (ALD) technique, followed by a sintering step to produce a multiferroic capacitor. The powder samples were characterized by XRD, XPS, SEM and TEM. Also, the magnetic and dielectric properties were evaluated and compared to bulk nanostructured ceramics of the same composition, but without the alumina shell.

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